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THREE FOSSIL DUNG BEETLES (COLEOPTERA: SCARABAEIDAE) FROM THE KENYA MIOCENE

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INTRODUCTION

Intensive work on Early Miocene deposits in the Rusinga and Mfangano Islands of Lake Victoria, has brought to light a highly significant palaeontological collection of mammals (Leakey 1967). In addition to these, many arthropods have also been uncovered. Of these, the Coleoptera were submitted to Dr. Crowson, who recognized among them a fair number of Scarabaeidae. The greatest number of these belong to the Melolonthinae, a quite natural feature as the subfamily is often highly conspicuous in the field, with massive appearances seasonally which should favour recovery as fossils. A few specimens could be referred to Rutelinae and to Cetoniinae. Three specimens seem to belong to the Scarabaeinae, and will be described here.

The Scarabaeidae are a large and conspicuous group of insects, known commonly as the dung-beetles. They are widespread in Africa today and are easily seen when they are building their nests and collecting dung. They can also be much in prominence at night when they come flying into lights. Although so common today, the three species described here are the first fossil record for the group in Africa.

The available specimens are not in a condition to allow a precise description, but as they are an important element in our knowledge of the past history of the Scarabaeidae, it seems necessary to place them on record, giving them a taxonomical status and good photographs to help future workers in their efforts to identify them.

TAXONOMIC DESCRIPTION

ANACHALCOS MFWANGANI new species

Type: a specimen from area B4, Mfangano Island (KNMI-MW 112, field no. Mfw 139:55). National Museums of Kenya, Nairobi.

Diagnosis: Length 16 mm; width 11 mm. The specimen is in bad condition; by the shape of the middle coxae it can easily be traced to the Scarabaeidae and Scarabaeinae. The shape of the pronotum with slightly flattened and depressed sides is quite typical of *Anachalcos*, but none of the characteristic features of the species can be described. The pronotum is covered with large but superficial points very densely distributed. The genus is, at present, known all over tropical Africa.

COPRIS LEAKEYORUM new species

Type: a male specimen from site R107, Rusinga Island (KNMI-RU 50, field no. R 695:52). National Museums of Kenya, Nairobi.

Diagnosis: Length 19 mm; width 9.5 mm; maximum length of pronotal process measured from the base of pronotum 6 mm; minimum width of pronotal process 4.5 mm. Body moderately elongated and convex. Head raised in the front and median area, but with no clearly defined horn or carina. Pronotum with a strong median process, rather narrow, very distinctly separated from the side areas, regularly raised from base to apices; apex with two strong, divergent teeth; sides of the process a concave line. Lateral areas of pronotum in a flattened expanse, depressed along the median process.

Four species of fossil *Copris* have been described up to now: three from Germany (Baden) in the upper Miocene, and from England (Mandestley) in upper Pliocene, and one from California, in the Pleistocene. The new form is the first listed from tropical Africa and from the lower Miocene.

It must be stressed here that the taxonomical differences between the genera *Catharsius* and *Copris* cannot be checked on the specimen available. The position as a *Copris* is based on the general proportions and size, which are evidently not entirely reliable. If the species is correctly assigned generically, it seems fairly close to the living *Copris wiesei* Kolbe, a species widely distributed from Uganda and Tanzania to eastern Zaire, Ruanda and Burundi. It differs from this species by the lack of a cephalic horn (but this might be due to fossilization processes) and by the median prothoracic process which is distinctly narrower and higher. The shape of the male pronotum is typical of a number of other living species from western, central, eastern and southern Africa. This stresses the fact that *Copris leakeyorum*, named after the Leakey family who contributed such a wealth of information on east African palaeontology, is quite closely related to living species.

METACATHARSIVS RUSINGAE new species

Type: a specimen from site R107, Rusinga Island (KNMI-RU 91, field no. R 3:53), National Museums of Kenya, Nairobi.

Diagnosis: Length 10 mm; width 7 mm. A very distinct species, with widely separated and parallel middle coxae. Body broad and only slightly convex. Head with clypeus in ogive, long, with slightly concave sides and distinct outside angle of the genae, about 90°. Head and pronotum with very superficial but large, very dense punctuation. The pronotum is remarkably broadened in front, with rounded front angles; much wider than the elytra, its greater width anteriorly. The anterior angle on the right side is much more widely extended outwardly than the anterior angle on the left side, this last may be broken. Sutural and third interstriae slightly more convex than the others; striae well defined; surface chagreened and slightly irregular.

The genus *Metacatharsius* (subgenus of *Catharsius* according to some authors) is widely distributed throughout tropical Africa, with over sixty species, often strictly localized. The specimen from Rusinga shows a fine carina crossing the prosternum from the front coxae to the outside margin, and a widely curved, not angular, meso-metasternal suture, which are characteristics of the genus. The widely developed pronotum is remarkable.

DISCUSSION

The three species described above, each represented by a single specimen amidst the fairly large number of specimens collected from the same sites and belonging to the Scarabaeidae, are all three members of the so-called dung beetles: large, middle sized or small beetles which feed on animal dung (particularly ungulates' dung) both as adults and larvae.

In this very large group (the known African fauna of today comprises something between 2000 and 3000 species of dung beetles), the three genera to which these species belong are known for their very elaborate nesting behaviour. The adults, both sexes working together, or the female only working, dig or burrow in the ground. In *Copris* (and probably in the other two genera) the burrow, once completed, is a wide underground chamber, in which the adults shape a number of pear-shaped nests from the masses of dung brought down from faeces lying immediately above the tunnel. In other genera, the dung is brought to the tunnel entrance by the female, or by both sexes working together, after it has been roughly shaped in a ball and rolled along the ground, sometimes for large distances.

The eggs are laid at the narrow end of the pear-shaped nest, or brood-pear, in a small chamber. The larva steadily eats its way through the mass of dung made available by the parents, feeding, as it seems, more from the bacteria and fungi which develop in the dung than on the dung itself. In *Copris* species, as far as known, the female remains in the burrow during all the larval and pupal development keeping watch on the brood-pears, and emerges with the newly formed adults. This complex behaviour seems to be very old, as fossil brood-pears are known from South American sites.

Copris species are found throughout Africa, though they are more common and diverse in woodland and wooded grassland biotopes than in forest biotopes. *Anachalcos* are even more distinctly woodland dwellers, though some species are found in openings in the rain-forest.



Plate I.—Fossil *Scarabaeidae* from Kenya Miocene.

upper row: *Anachalcos mfwangani* n. sp.—dorsal view, lateral view, ventral view.
 middle row:—*Copris leakeyorum* n. sp.—dorsal view, lateral view, ventral view.
 lower row: *Metacatharsius rusingae* n. sp.—dorsal view, lateral view, ventral view.

Most *Metacatharsius* belong quite distinctly to woodland-bushland biotopes and are common in fairly dry conditions, up to sub-desert. In addition, it is probable that the Scarabaeidae species, particularly those belonging to the Melolonthinae and Cetoniinae which were found with the three species and cannot yet be described, lived in drier woodland—bushland habitats rather than in forest habitats.

The fauna could, thus, be referred to open woodland or wooded grassland rather than to closed rain-forest. But the very limited available material, and the possibility that the species were transported to the collecting site, by a flood, or by the regular flow of a small river, precludes any definite assertion.

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